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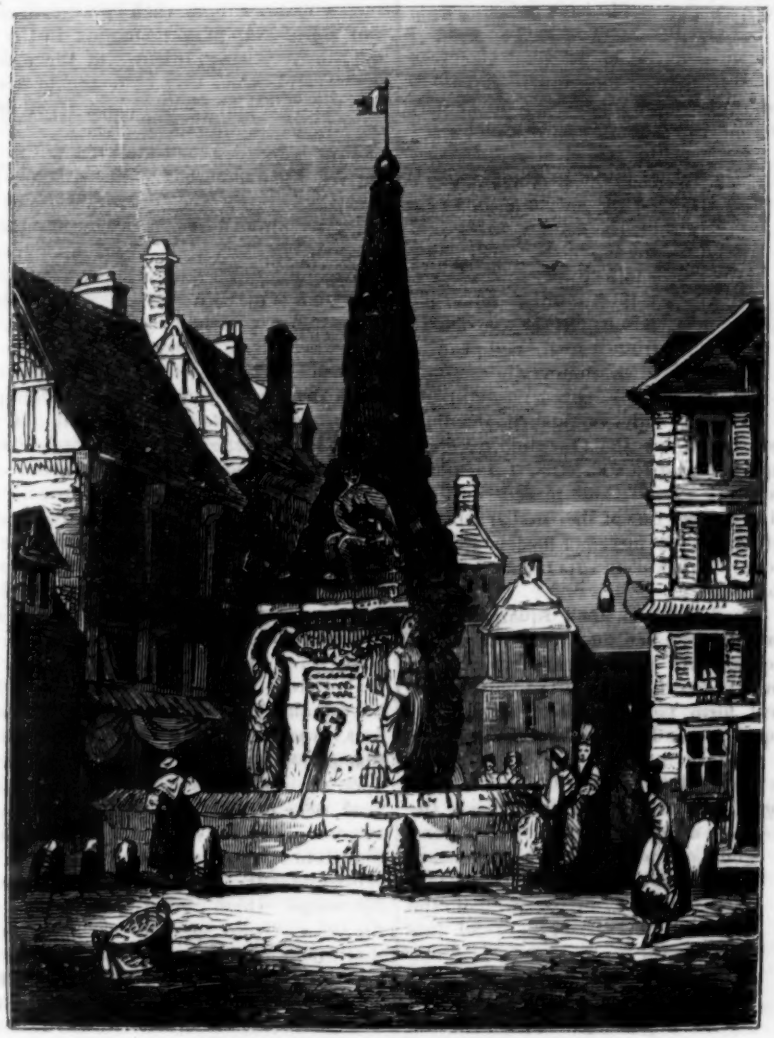

FOUNTAIN OF INNOCENCE, AT NOYON.

THE TOWN OF NOYON, IN FRANCE,

The Birth-place of Calvin.

Noyon is a town of importance in the north of France, lying to the north-east of Paris at the distance of sixty-two miles (English,) and to the north-west of Soissons at the distance of twenty-two miles. It stands upon the banks of a little stream called the Vorse, which joins the Oise; there is also another small stream running through it, and likewise emptying itself into that river which passes by not very far off. This town was formerly the capital of the district called the *Noyonnais*, which was a part of the ancient province of Picardy; under the present territorial division of France, it is comprised in the department of the Oise, so named after the river just mentioned.

Noyon is a very ancient town. It existed prior to the subjugation of Gaul by the Romans, and was fortified with a high wall and a deep ditch, as we learn from Cæsar, when he made his second campaign in that country against the *Belgæ*, in the year 57 before the Christian era. Its name has, however, suggested to some fanciful speculators, a much higher antiquity; for "some say," to use the language of the celebrated French antiquary, André du Chesne, "that it was founded a short time after the Deluge, and that to render the memory of Noah estimable, the founders of the town named it after his name. But as for me," continues that writer, "I do not vainly trouble myself to illustrate by a superstitious affinity of names, the origin and foundation of every town."

Setting aside these speculations, however, the great antiquity of the town is undisputed; for it is universally admitted to be the same with that mentioned by Cæsar under the name of *Noviodunum*, in the following passage of his commentaries after describing

the advance of the Belgic Gauls in a body against his camp, and their precipitate retreat to their respective territories, there to await his attack singly.

On the morrow, before the enemy had recovered from their terror and flight, Cæsar led his army into the country of the Suessones, (in which Soissons now stands,) who were next to the Rhemi (or inhabitants of the country in which Rheims now is;) and after performing a long journey, marched to the town of Noviodunum (Noyon.) He attempted to take it at once by storm, as he marched by, because he heard that it was destitute of defenders; but on account of the breadth of the ditch, and the height of the wall, although there were but a few defending it, he could not so take it. Having fortified his camp, he began to prepare the *vineæ**, and whatever was used for the purpose of an assault. In the mean while, the whole multitude of the Suessones arrived, after their flight, in the town the next night.

The *vineæ* being quickly brought up to the town, a mound being raised, and towers being built upon it, the Gauls terrified at the magnitude of works, such as they had never seen or heard of before, as well as at the celerity of the Romans, sent ambassadors to Cæsar concerning a surrender, and at the request of the Rhemi they obtained their safety; Cæsar having taken as hostages their chief men, and the two sons of the king Galba himself, and having caused all the arms in the town to be given up to him, received the submission of the Suessones.

In the middle ages, Noyon suffered many severe calamities. In 859 it was captured and pillaged by the Normans, who did not spare the bishop, we are told, in the general plunder. Three times in the space of one century it was partially destroyed by fire,—in 1131, 1152, and 1228. In 1516, a treaty of peace was concluded at Noyon, between Francis the First of France, and Charles the First of Spain, (afterwards the Emperor Charles the Fifth,) which, for a time, put an end to the hopes which Henry the Eighth of England entertained, of forming an offensive league against France. The famous battle of St. Quentin, in which Philip the Second of Spain, (the husband of Mary Queen of England,) aided by English troops, completely defeated the French, was fought in the neighbourhood of Noyon in 1557; the town was shortly afterwards taken by the Spaniards, and almost wholly burnt by them. "But like Antæus," to use the classical metaphor of Du Chesne, "it has always gathered strength from its fall, and has arisen from the deepest of its ruins."

The capture which honours it most, (says the same writer,) is that which our king (Henry the Fourth) made of it, in 1591, from the Leaguers. He beseiged it in the month of August, and having defeated four times the succour which was sent to it on the part of the League, and having killed the most resolute of the party, taken a great number of prisoners, and put the remainder to flight, he compelled the beseiged to surrender on the 17th of the month. The Duke of Mayenne, with the Sieurs de Belin, Vitri d'Alincourt, and others, were desirous of making an attack on Mantes, thinking thereby to divert the king from his purpose, and they endeavoured also to force the Swiss, stationed at Hudan; but all their efforts were in vain, as were also those which they made to relieve Noyon; for the king, without being disturbed by these arrangements, followed up his point, and under the very nose of his enemies, who dared not come to an engagement with him, rendered himself master of the place; and then having thus covered with shame the Leaguers and the Spaniards, he went, in addition, as far as Han to harass them and invite them to the combat; but they never were in the humour to partake of it.

This town stands upon the slope of a hill; its situation is good and it is well built. There are no public buildings worthy of notice with the exception of the cathedral, the ancient episcopal palace, and the town-house. This last is a regular structure, standing in a square, adorned with a fountain, the water of which is brought from a hill in the neighbourhood. The town possesses several other fountains, which contribute largely to the health and comfort of the inhabitants. The cathedral is of great antiquity; it was begun by Pepin and finished by Charlemagne. It is upwards of three hundred feet in length, and has two large towers, each two hundred feet in height. The see of Noyon was founded in the earlier half of the sixth century, when the town of St. Quentin, which had previously been the seat of a bishopric, was destroyed by the Vandals. The bishop of Noyon was the last of the three "ecclesiastical court-peers" of France; and, at the coronation of the king, he always carried the baldrick. Some peculiar ceremonies, of great local importance, were practised when he made his entry into the town. The population of Noyon is about six thousand; the inhabitants are engaged in some manufactures of linen, cotton, &c., and carry on also a trade in corn.

Noyon is remarkable as having been the birth-place of the celebrated reformer Calvin, who was born there on the 10th of July, 1509. His father, Gerard Calvin, or Cauvin, as the name is more correctly written, was by trade a cooper; and though of respectable character, his circumstances were too humble to have permitted him to give his son a complete education. Fortunately, however, the youth, having exhibited at an early age a pious disposition, attracted the notice of a wealthy family in the town; and being taken under their protection, was sent to Paris to study for the church. Before he had reached his twelfth year, he was preferred to a benefice in the cathedral of Noyon, not a canonry as is sometimes said, but a chapelry bearing the name De la Gesine. About five years afterwards he obtained also the cure of Monteville; but this he exchanged at the end of two years for the cure of Pont L'Evêque in the vicinity of the town. His residence was, however, at Paris, where he continued to pursue his studies, not having even received priest's orders. It was from a native of Noyon, a fellow scholar of his, that Calvin procured a copy of the Scriptures, the perusal of which forced upon his mind a conviction of many of the errors of the Church of Rome. He returned to Noyon upon the death of his father, but after a short stay again went to Paris, and does not seem to have subsequently renewed his connexion with his native place, from which, indeed, he was in a great measure cut off after he had drawn down upon himself the hostility of the Romanists, by his open defence and preaching of the doctrines of the reformation. That he was not, however, forgotten, we have a proof in an interesting circumstance which occurred while he was labouring at Geneva to cement the fabric of the church which he had established there; the canons of Noyon, in the year 1556, publicly returned thanks to God for his recovery from an illness which it had been apprehended would prove mortal. Noyon was also the birth-place of Jacques Sarazin, a famous French painter and sculptor, who was born there in the year 1598.

* The *vineæ* of the Romans were moveable sheds constructed of wood and hurdles, and covered with earth or raw hides, or any other substance which could not easily be set on fire. They were pushed forward to the walls of a besieged town, upon wheels, and under the shelter which they afforded, the assailants either worked the battering-ram, or tried to undermine the walls

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THERE is not a book on earth, so favourable to all the kind and all the sublime affections, or so unfriendly to hatred and persecution, to tyranny, injustice, and every sort of malevolence, as the Gospel. It breathes nothing throughout but mercy, benevolence, and peace.—BEATTIE.

OPEN not thy gate to flatterers, nor thy ears to backbiters. —SIR THOMAS SMITH.

ILLUSTRATIONS OF THE BIBLE FROM THE MONUMENTS OF ANTIQUITY.

No. V.

Pharaoh's Dreams.

Pharaoh's dreams refer to objects before him in his waking hours. "Behold there came up out of the river (Nile), seven kine, fat-fleshed and well favoured, and they fed in a meadow." (Gen. xli. 2). The *Achu*, rendered "a meadow," by our translators, more properly signifies some species of flag or reed. We know, both from the monuments and the writings of the ancient historians, that the cultivation of aquatic plants formed an essential part of the agriculture of Egypt. Herodotus gives us the following account of the great attention paid to this branch of industry in the marshes of the Delta. "The customs of those who reside in the marshes, do not differ from those of the other Egyptians, but they have devised the following inventions for procuring an easy supply of food. When the river attains its height, and the plains are covered, great numbers of lilies spring up in the water; to these the Egyptians give the name of lotus. They carefully gather them, and dry them in the sun; they then squeeze out the seeds from the pods of the lotus, which resemble those of the poppy, and having formed them into loaves bake them over the fire. The root also of this lotus, which is roundish, and of the size of an apple, is eatable; its flavour is moderately sweet. There are also other lilies of a different kind, somewhat similar to roses, produced in the river, the fruit of which is contained in a calyx, or cup, on a separate stem, which springs up from the side of the root; it is in shape like the combs formed by the wild bees. In the calyx, or cup, are found many kernels, about the size of an olive-stone; they are eaten both green and dried. The byblus is an annual plant; after they have plucked it from the marshes, they cut off the top part, and use it for many and various purposes; the lower part, which is about a cubit in length, is good for food, and is commonly exposed for sale. Those who desire to make a very delicate dish of the byblus, stew it in a hot pan, and so serve it up."

Theophrastus confirms this account of the edible aquatic plants, and he adds that the parts not used for human food, were given as fodder to sheep and oxen. The *Achu* on which Pharaoh, in his dream, beheld the cattle feeding, was, probably, one of the esculent river plants. It is remarkable that, in the corn-harvest, the straw was usually neglected, the reapers cutting off only the ears, but in the lotus-harvest the reapers cut the stems very low, and great care was taken in binding the sheaves, because every part of these vegetables might be turned to profitable account.

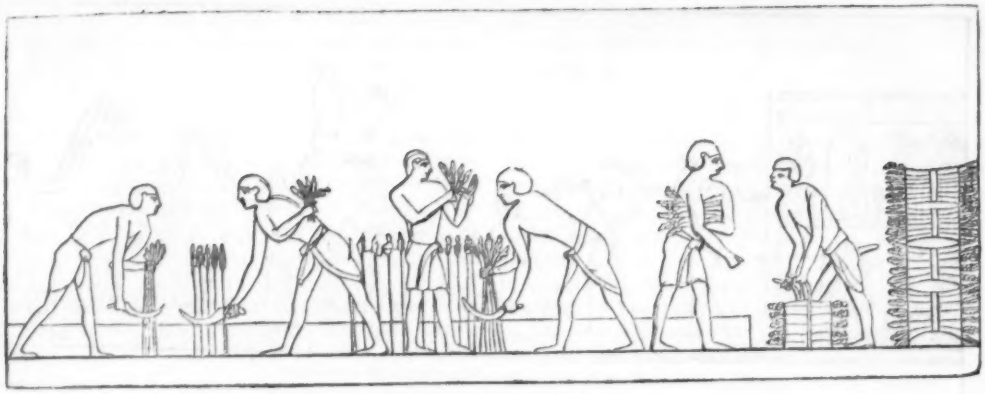
The two species of lotus mentioned by Herodotus are the *Nymphea lotus* and the *Nymphea nelumbo*. The former is still found in great abundance near Damietta. The stalk rises about five feet above the surface of the water, but it sometimes attains a greater height, and hence we find it frequently intermixed with the byblus in Egyptian paintings. Savary mentions in his Travels, that the seed is still used as an article of food in Lower Egypt. The *Nymphea nelumbo*, or *Nelumbium speciosum*, is a plant well known in India; it does not appear to be now cultivated in the valley of the Nile, but it was anciently an object of great attention. Belzoni found it depicted in its natural colours, with its stalk, flower, and fruit, in one of the tombs which he opened; and in the great French work on Egypt, we find that a nelumbo harvest is represented in one of the royal sepulchres, thus intimating that it was deemed a luxury worthy of sovereigns. It is not generally known, that the byblus grows in a part of Sicily, near Syracuse, but nowhere else in Europe. The late Chevalier Landolina succeeded in manufacturing papyrus from its leaves, specimens of which were sent to the principal museums and cabinets of Christendom. He likewise bears testimony to the sweetness of the sap, and describes the interior pulp as similar to the sugar-cane.

It is said that the seven kine were "fat-fleshed and well-flavoured," and we find from the monuments that the fattening of cattle was very extensively practised in Egypt, and that the superstitious abstinence from animal food, which some authors ascribe to the ancient Egyptians, must have been limited to a particular sect or district. This attention to the feeding of cattle serves to explain a difficulty in the history of the ten plagues: in the account of the plague of murrain, it is said, "all the cattle of Egypt died," (Gen. ix. 6); and in the same chapter we are told that some of the Egyptian cattle were subsequently destroyed by the hail. But those who have dwelt upon this apparent contradiction have overlooked the limitation to the plague of murrain, in its announcement, "Behold the hand of the Lord is upon thy cattle *which is in the field*;" the plague consequently did not extend to the beasts which were preserved in stalls and enclosures, and consequently there remained after the plague of murrain a considerable number liable to be destroyed by the hail.

Many commentators have expressed surprise at "the kine coming up out of the river," but this is a circumstance with which all travellers in the East are familiar. All animals of the buffalo kind, in hot countries, delight to stand for hours in the water, with every part of the body, except the head, immersed, both to cool themselves and to avoid the annoyance of flies and other insects; indeed we see the same thing frequently occur in England. It deserves also to be noticed, that the ox among the Egyptians was the ordinary symbol of agriculture and subsistence, and it was natural, therefore, that the visionary emblems of abundant harvests should seem to come from the Nile, the great source of the fertility of the country. Though in most cases it is very difficult to trace the analogy which induced the Egyptians to adopt any particular symbol, we can at once discover the reason why the ox was made the emblem of farming operations, because there was scarcely one in which this useful animal was not employed. The ox drew the plough, carted home the harvest, and as we shall hereafter see, threshed out the grain. A more striking emblem of agricultural produce could scarcely be devised than the animal which lent such efficient aid to the cultivation in every one of his labours.

In his second dream Pharaoh beheld that "seven ears of corn came up upon one stalk, rank and good." (Gen. xli. 7). The prolific harvests of Egypt were always celebrated, the crops depicted on the monuments are always represented very rich, and modern travellers have found corn-plants with more than seven ears on one stalk, growing in the lower valley of the Nile.

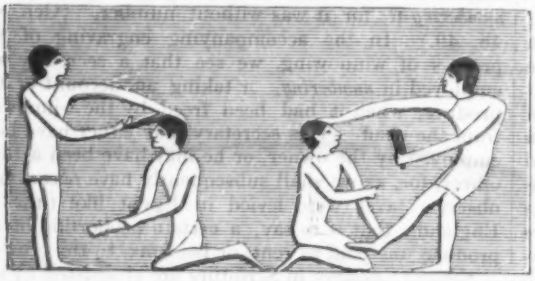
When Joseph was summoned from his dungeon to interpret Pharaoh's dream, the historian mentions a minute particularity, which our habits prevent us from noticing with the attention it merits. "Then Pharaoh sent and called Joseph, and they brought him hastily out of the dungeon, *and he shaved himself*, and changed his raiment, and came in unto Pharaoh."



REAPING THE LOTUS.

(Gen. xli. 14). Unlike the other oriental nations, the Egyptians did not wear beards, and they were the only people who practised shaving from remote antiquity; indeed it is chiefly by their want of a beard, that the native Egyptians are distinguished from their allies and captives on the monuments. This practice could only have been known to a person well acquainted with Egypt, for the Hebrews cherished the beard, and considered its loss a great disgrace. But Joseph here conforms himself to an usage, which but for the Bible and the monuments would never have been known to have existed.

Indeed, the attention bestowed by the Egyptians on the hair and beard, seems to have been regarded by them as one of the distinguishing marks of their superior civilization. We see them, as in the annexed engraving, employing professional barbers and hair-

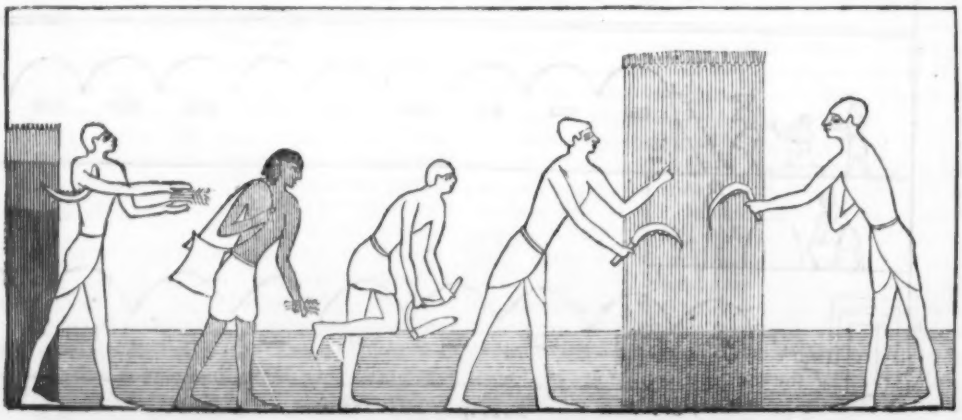


dressers, and we invariably find the captives from barbarous tribes depicted with rough beards and shaggy locks, as if no more striking marks could be given of their inferiority to the highly-cultivated nation which was subject to the sway of the Pharaohs.

Pharaoh was so delighted with the wisdom displayed by Joseph in the interpretation of his dream, that he appointed him his prime minister. The form of investiture is remarkable. "And Pharaoh took off his ring from his hand and put it upon Joseph's hand, and arrayed him in vestures of fine linen, and put a gold chain about his neck; and he made him to ride in the second chariot which he had, and they cried before him, 'Bow the knee;' and he made him ruler over all the land of Egypt." (Gen. xli. 42, 43). Investiture by the gift of a seal-ring and robe of honour is still common in the East; and we learn from the monuments, that the privilege of wearing a gold chain was reserved for persons of high rank, and was probably an ensign of their dignity. The chariot was peculiar to the Egyptians, and the right of riding in one of their splendid vehicles appears to be reserved for kings and princes; no persons of inferior rank appear thus mounted, on the monuments, and hence we can appeciate the historian's accuracy in specially mentioning, that Joseph rode only in "the second chariot." It deserves also to be noted, that the word *abrek*, rendered by our translators, "bow the knee," is interpreted differently by most of the ancient versions; they consider it as two words, *ab rek*, that is, "father of the land, or people," an epithet frequently applied to viziers or ministers in the East at the present day.

It is recorded, that "in the seven plenteous years, the earth brought forth *by handfuls*." (Gen. xli. 47). This singular expression appears to allude not merely to the great abundance of the crop, but also to the Egyptian custom of reaping only the ears of corn, neglecting the straw as an article of little value. We see the figure to the left in the accompanying engraving, holding a handful of corn, while an inferior labourer is carrying away the collected ears in a basket.

The shortness of the ears cut off by the reaper is attested by the basket, the shape of which obviously renders it unfit for carrying straw, and also by the bundles which the figures on the left hold in their



REAPERS OF THE CORN.

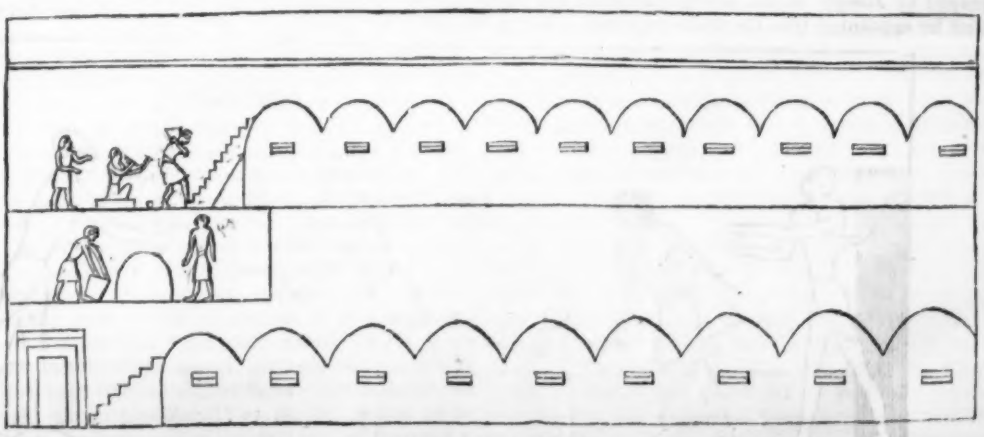
WINNOWING, MEASURING, AND STORING.

hands. But we must not infer from this that the Egyptian corn was remarkable for a short stem; on the contrary, we see in this very engraving that it grew to a very considerable height; the straw, however, was not regarded, on account of the great abundance of reeds and lotus in the country, which both afforded more succulent fodder for cattle, and also were stronger and more durable for covering the roofs of huts and houses. It is from this peculiarity of Egyptian farming that we never see a gleaner represented in any of their pictures of a harvest, and that their reaping-hooks are shorter and more curved than those with which we are familiar in this country. It is not always easy to identify the various species of grain depicted on the monuments; indeed, it is probable that most of the varieties of bread-corn, especially wheat, have been produced by cultivation. Botanists have not agreed upon the particular species of *Triticum* which was first cultivated by farmers; but we have every reason to believe that it was an Egyptian plant, for unquestionably Egypt was the country in which it was first cultivated.

The Bible first mentions wheat as the produce of Egypt: the monuments show that its cultivation was practised before the age of profane history, and the earliest traditions of Greece and the Mediterranean islands agree, that the knowledge of grain was derived from Egyptian emigrants. There is one more particular respecting the cultivation of grain mentioned by the sacred historian, which has hitherto escaped the notice of commentators, but which is singularly confirmed by the monuments and by profane history. It is particularly mentioned, that the corn-farms were all in the vicinity of cities. It is said of Joseph, "the food of the field *which was round about every city*, laid he up in the same." The monuments exhibit to us the farm-labourers numerous and unarmed, while the historians assure us, that those parts of Egypt at a distance from the cities, were exposed to the ravages of the plundering hordes on the eastern and southern frontiers of the country. Hence we see how forcible, and how just is the specification of the sacred historian, "that the corn-fields were round about every city," a circumstance which at once stamps the truth and authenticity of the narrative.

In the account given us of Joseph's prudent administration, we find a distinct reference made to another Egyptian usage, which can only be explained by a reference to the monuments. "And he gathered up all the food of the seven years which were in the land of Egypt, and laid up the food in the cities; the food of the field which was round about every city, laid he up in the same. And Joseph gathered corn as the sand of the sea, very much, *until he left numbering it*, for it was without number." (Gen. xli. 48, 49.) In the accompanying engraving of the process of winnowing, we see that a secretary was employed in *numbering*, or taking an account of the produce, when it had been freed by the winnowers from the chaff. This secretary may either have been employed by the owner, or he may have been a royal officer, for, as we shall subsequently have occasion to observe, taxes were levied in Egypt like tithes in England; that is to say, a certain proportion of the produce was paid as rent, or land-tax, to the crown.

Several passages in Scripture are elucidated by this view of the process of winnowing. We find that the grain, after having been trodden out by the oxen, was taken up in a scoop, or slightly hollowed shovel, and flung against the wind. The broken straw and the chaff were thus blown away, hence the Psalmist compares the ungodly to "the chaff, which the wind driveth away." (Psalm i. 4.) The shovel used in this



EGYPTIAN GRANARIES.

operation, was called by the Hebrews *mizreh*, which is rendered "fan," in our versions; Isaiah alludes to it in describing God's tender mercies towards his church: "The oxen likewise, and the young asses that plough the ground, shall eat clean provender, which hath been winnowed with the shovel and the fan." (Isaiah xxx. 24.) John the Baptist describing the advent of the Messiah, makes a more direct allusion to this winnowing process: "Whose fan is in his hand, and he will throughly purge his floor, and gather his wheat into the garner, but the chaff he will burn with unquenchable fire." (Matt. iii. 12.)

The storing and gathering of corn into the granaries, is frequently depicted on the monuments; we can see that the stores were very capacious, and that it is not improbable that they might have contained a supply sufficient for the seven years of famine.

Another peculiarity of these granaries deserves to be particularly noticed. The roofs of the stores are arched; the investigations of modern travellers have sufficiently proved that the principles of the construction of the arch were known both to the ancient Egyptians and the Ethiopians, although they were not understood by the architects of Greece and Rome. The great extent of the stores in the accompanying engraving, and in many other similar representations, might surprise us, did we not know that Egypt was the granary of the ancient world, and that even after the prudent administration of Joseph, it was considered an object of the utmost importance to have a large stock of corn in store.

All ancient historians agree in attributing great political power to the priesthood, and their accounts are confirmed by the monuments. It was on this account that Joseph connected himself with the priestly caste, by marrying "Asenath, the daughter of Potipherah, the priest of On." Commentators, however, have omitted to remark, that agriculture was peculiarly under the protection of the priests. In the representation of a victorious monarch coming to pay homage to the gods for their protection, the importance of agriculture is manifested amid all "the pride, pomp, and circumstance of glorious war;" when the king comes forward to present his offering, a priest holds out to him a bundle of corn, which the monarch cuts through with a sickle before depositing his gift on the altar. The peculiar nature of Joseph's trust requiring him to take charge of all the farming operations throughout Egypt, must consequently have rendered his reception into the priestly caste highly expedient, if not absolutely necessary. It is certain, that when a king was elected who did not belong to the priestly order, he was received into the sacerdotal caste by adoption. Hence there arose a necessity for Joseph's marriage with the daughter of an idolatrous priest, a union which, under other circumstances, would be censurable and improper.

We have now traced Joseph's career, from his entrance into Egypt as a slave, to the moment when he became the administrator of the kingdom, and have shown that the existing monuments confirm the accuracy of Scripture in the most minute particulars of his history.

CARBONIC ACID.

No. IV.

AIR, which is exhaled from the lungs of mankind and the inferior animals, in the process of respiration, contains a considerable quantity of Carbonic Acid,—a fact first noticed by Dr. Black, and since his days confirmed and elucidated by many other eminent philosophers.

The means for detecting this gas are so simple that we shall describe them. Any of our readers may perform the experiment, which requires no great amount of chemical knowledge, or of skill in manipulating, to insure its success. First of all, some lime-water must be prepared. To do that, it is only necessary to procure a piece of quick-lime, the size of a marble, and, after it has been slaked, let it be mixed with half a pint of clean water. In an hour, or less, that portion of the lime not dissolved by the water will subside, when the latter being poured off into a glass vessel,—an ale-glass will be found the most convenient,—it is fit for use. We may just mention, as a curious fact, that cold water dissolves a larger quantity of lime than hot. At the temperature of 60°, one grain of lime requires for its solution 778 grains of water; at the boiling temperature, (212°) 1270 grains of water are required.

To proceed with our experiment; let us take a piece of quill, or glass tubing, and if neither of these happen to be at hand, part of the stem of a tobacco-pipe will do equally well. Inserting one end of the tube, whatever it may be, about an inch below the surface of the lime-water, and the other end in the mouth, we must blow gently through it for the space of two or three minutes, and then observe the effect. The water which, previously to our blowing into it, was perfectly clear, will present a milky appearance, occasioned by the Carbonic Acid expelled from the lungs uniting with the lime dissolved by the water, and forming chalk (carbonate of lime). A knowledge of the affinities thus subsisting between lime and carbonic acid, furnishes the chemist with an extremely delicate and convenient, as it is also an unerring, test for that gas. It also explains our motives for recommending, in a former paper*, lime and water, as being preferable to water alone, for removing Carbonic Acid from sewers, or other cavities, where it is known or suspected to exist.

Having shown how Carbonic Acid may be detected, as constituting a part of the air given off by the lungs, it may not be uninteresting to inquire a little into its relative proportions. Before that can be done, it will be necessary to devote a few minutes to the subject of respiration generally, limiting our observations, however, to the phenomena exhibited by the human subject.

It is scarcely possible to determine, with anything like perfect accuracy, the quantity of air received into the lungs at each inspiration. Whatever may be the form of apparatus employed for the purpose, it must necessarily interfere, in some degree, with the natural process of breathing; and hence the results so obtained will, at the best, be only approximations. Judging from our own experiments, made with great care some years ago, and repeated just previous to the moment at which we are writing, and comparing them with those conducted in a manner somewhat similar by others, we believe that from 15 to 18 cubic inches of air, at a temperature of 60°, may be assumed as very nearly representing the actual quantity which, under ordinary circumstances of health and tranquillity, passes into the lungs of an adult at every inspiration. The quantity expired is about the same, subject, however, to occasional variations, which depend upon circumstances that we cannot now enumerate. The average number of inspirations and expirations in a minute is 40, so that allowing 18 cubic inches (rather more than half an imperial pint,) of air to pass into the lungs at each inspiration, it follows that every adult individual will require 21,600 cubic inches (equal to 78 gallons,) of air per hour,

* See *Saturday Magazine*, Vol. XI., p. 142.

and in 24 hours the quantity necessary to sustain life will be 518,400 cubic inches, equal to 300 cubic feet, or 1872 gallons.

The entire capacity of the lungs has been variously stated, but we think that 300 cubic inches is very near the mark. After a natural expiration, at least 150 inches of air can be forced out of the lungs by voluntary exertion, which, added to the 18 expired in the ordinary way, make 168; and it is supposed that a quantity, equal to about 130 inches, remains in the lungs after every attempt made to empty them. If this view of the matter be correct, it will be seen that the whole of the air contained in the lungs, will be renewed by 17 inspirations, or in rather less than one minute. Although it is impossible for us to ascertain, whether any portion of the air taken into the lungs at one inspiration, is expelled by the expiration immediately succeeding it, yet it seems rational to conclude, that such is not the case, especially when the formation of Carbonic Acid is taken into the account, a subject which by these preliminary observations we intend to illustrate.

Supposing 18 cubic inches, which we have assumed as the maximum quantity of air taken into the lungs at each inspiration, to be, as we believe it is, very near the truth, the relative proportions of oxygen and nitrogen will be $3\frac{4}{10}$ths inches of the first-mentioned gas, and $14\frac{6}{10}$ths inches of the latter, the Carbonic Acid present in so small a quantity of air being scarcely appreciable. This is the state of things when the air enters the lungs. Let us now inquire into the circumstances attending its exit. And here our attention will first be arrested by the fact, that although about one-third part of the oxygen will have been apparently lost, yet that, as respects the total quantity of aëriform fluid respired, and compared with that inspired, no perceptible diminution will have taken place. On a more careful examination, it will be ascertained that the place of the oxygen which had disappeared, is supplied by an equal quantity of Carbonic Acid; whence it is manifest, that during the few moments atmospheric air remains in the lungs, a portion of its oxygen combines with the vapour of carbon, and forms Carbonic Acid; the origin of the latter gas in the process of respiration being thus satisfactorily accounted for. We may further remark, that the gases expelled from the lungs will be found to exceed in weight those inhaled, the increase amounting exactly to what might be expected, from the well-known superior density of Carbonic Acid as compared with oxygen gas.

With these facts before us, there is no difficulty in understanding how it is that air which has once entered the lungs, is thereby rendered unfit to be breathed over again. It has become, in two ways, incapable of sustaining the vital energies; first, by the withdrawment of oxygen, and next, by the addition, or rather substitution, of Carbonic Acid. Were the air which has once been breathed to pass immediately into the lungs again, we can easily conceive that it would be still further deteriorated; and if it were possible to repeat the process three or four times, the air thus operated on would produce suffocation. This is precisely what has happened in some instances to persons who have descended to the bottom of the sea in diving-bells. By the accidental disarrangement of the air-tubes, or a misunderstanding on the part of the assistants of the preconcerted signals, the supply of air has been interrupted, when those within the bell, having at length exhausted the oxygen it contained, have been suffocated. One of the most appalling incidents upon record, is that of the confinement of 146 of our unfortunate countrymen who were made prisoners in 1756 at Calcutta, and shut up in a close dungeon, whence, a few hours afterwards, 23 only returned alive.

The quantity of Carbonic Acid disengaged from the lungs is liable to frequent variations, differing in different individuals, and in the same individuals at different times. By day it is more abundant than at night, beginning to increase about daybreak, and continuing to do so till noon, and then decreasing until sunset. From that time till the morning it remains tolerably uniform, the proportion being one-fifth less than during the middle of the day. Food, exercise, mental emotions, and especially disease, affect the functions of respiration. Hence the proportion of Carbonic Acid given off by the lungs, is greatest when the digestive organs are in a healthy state, and stimulated by wholesome food; whilst, under the influence of low diet, or depressing passions, it constantly diminishes.

It would lead us too far away from the subject now in hand, were we to notice the changes which take place in the colour and qualities of the blood, by exposure to the influence of atmospheric air in the lungs. These changes, the means by which they are effected, and the probable cause of animal heat, as being intimately associated with them, must receive a separate notice at a future day.

Decay and reproduction are unceasing processes,—in some instances succeeding each other with a rapidity that eludes the most rigid observation, in others advancing so slowly, that years, and even ages, pass away ere their effects become apparent. By experience and observation we are affectingly reminded, that no part of the visible creation is more susceptible of change than ourselves. Our corporeal frame is described by the pen of inspiration as a tabernacle. In its very best state it is but a frail tenement of clay. There is nothing about it that resembles a substantial and long-enduring building. True it is, that the elements of which it is constructed, are in themselves durable, but as respects their habits and uses and properties, nothing can be conceived more changeable or uncertain. What a mercy is it that He, in whose hands are the issues of life, knoweth our frame, and remembereth that we are but dust!

Let it not for one moment be supposed, that changes of form and of place imply that anything is lost or destroyed. Matter, whatever variety of forms it may assume, is imperishable. Solids may become liquids, and liquids may be converted into vapours or gases, but this is nothing more than what is destined to accomplish the beneficent purposes of the Creator. The fire may burn, the water dissolve, and the tempest scatter, but these occasion neither waste nor disorder. On the contrary, they are among the most effective agents by whose instrumentality we realize the promise, that "while the earth remaineth, seed-time and harvest, and cold and heat, and Summer and Winter, and day and night, shall not cease."

The world in which we live has existed, as respects the present arrangement of its materials, about 6000 years; a period, when compared with that which has elapsed since the elementary particles of our globe were first created, which is perhaps as a drop from a bucket in the accumulated waters of the ocean. It is perfectly natural, that we associate ideas of durability with hard substances; hence stones have, in all ages, been selected for monumental columns and for national edifices; these, in various parts of the world, have withstood the Summer's heat and the Winter's blast during many centuries; and although, as in some instances, they present only unshapen masses or piles of ruins, yet, even in that state, they testify

that hundreds, and perhaps thousands, of years have passed away since they were hewn from the quarry.

We have stated in a former paper, that Carbonic Acid enters largely into the composition of the materials of which the solid fabric of our globe consists. It has also been shown how this gas can be obtained, namely, by putting a piece of chalk into a mixture of hydrochloric acid (spirit of salt,) and water, and if this acid cannot be conveniently obtained, common vinegar may be substituted. We have referred to this matter again, to point attention to the simplicity of the means by which we can disturb the repose of elements, whose affinities have been exercising a mutual influence during perhaps hundreds of thousands or millions of years.

The diamond consists of pure carbon, and it is supposed to differ from carefully prepared charcoal only in the aggregation or arrangement of its particles. The combustion of the diamond in oxygen gas is an experiment which has often been repeated, and with the same result, namely, the formation of Carbonic Acid; and this is exactly what happens with charcoal under similar circumstances. Here we may notice, that the high value attached to the hardest, as it is also the most costly, of gems, is due rather to its comparative scarcity than to the possession of any intrinsic excellence. Some diamonds have cost upwards of 100,000*l.*; but see how soon they may be changed into a gaseous compound, in quantity scarcely sufficient to impart briskness to a bottle of soda-water!

Under the influence of cold and pressure, Carbonic Acid is obtained in a liquid state; by an ingenious application of this liquid, in promoting its own evaporation, it has been rendered solid. In both these forms it is a highly-dangerous compound, and rather a matter of curiosity to the chemist than of practical utility, and hence possesses but little interest for our readers. Here we conclude.

ADVENTURE WITH AN ELEPHANT.

A PARTY set out to ascend one of the rivers at Delagoa Bay, for the purpose of hunting the hippopotamus. Whilst they were in quest of the haunts of those huge animals, a shrill angry cry reached their ears, and presently, Mr. Barrette, a midshipman, rushed from the reeds, his face covered with blood, calling loudly for assistance to Lieutenant Arlett, who had just been attacked by an elephant. The party proceeded to the spot, and found their unfortunate comrade stretched motionless on his back, covered with blood and dirt, and his eyes starting from their sockets, in all the expressive horror of a violent death. It was some time before he showed any symptoms of life; they succeeded, however, in carrying him on board, where he gradually recovered, and when he became sufficiently collected, he gave an account of what befel him, which shows the extraordinary sagacity of the elephant, when in its wild state. He, at the first approach of the animal, thought he had stumbled upon an enormous hippopotamus, the object of their pursuit, but he was soon undeceived. The animal, which appeared highly irritated at the intrusion, waved its trunk in the air, and the moment he spoke, reared upon its hind legs, turned short round, and, with a shrill, passionate cry, rushed after him, tearing down the opposing reeds in his way, while Lieutenant Arlett vainly attempted to effect his escape. For a short time he had hopes of eluding his pursuer, as the animal perceived one of the seamen mounted on the top of a tree, about twenty feet high, and three in circumference, menacing him by his voice and gestures, while preparing to fire. The elephant turned short round, and, shrieking with rage, made a kind of spring against the tree, as if to reach the object of his attack, when his ponderous weight bore the whole to the ground, but fortunately without hurting the man, who slipped among the reeds. The ferocious animal still followed him, foaming with rage, to the rising bank of the river; the man crying loudly, "An elephant! an elephant!" until closely pressed by his pursuer, they both came upon the top of the slope, where the party who had heard his cries were prepared, and instantly fired a volley as the elephant appeared. This made him return with increased fury to Mr. Arlett, who, in his eagerness to escape, stumbled and fell, the huge beast running over him and severely bruising his ancle.

As soon as he had passed, Mr. Arlett arose, and limping with pain, attempted once more to retreat, but the animal returned to the attack; his trunk was flourished in the air, and the next moment the unfortunate officer was struck senseless to the ground. On recovering himself, his situation appeared hopeless, his huge antagonist standing over him, chafing and screaming with rage, pounding the earth with his feet, and ploughing it with his tusks. When the party first saw them, Mr. Arlett was lying between the elephant's legs, and had it been the intention of the animal to destroy him, placing a foot upon his senseless body, would in a moment have crushed him to atoms; but, it is probable that his object was only to punish and alarm, not to kill,—such conjecture being perfectly in accordance with the character of this noble but revengeful beast.

It appeared that the elephant, on his last return to Mr. Arlett, had filled his trunk with mud, which, having turned him on his back, and forced open his mouth, he blew down his throat, injecting a large quantity into the stomach. It was this that produced the inflated appearance of Mr. Arlett's countenance, for he was almost in a state of suffocation, and for three days after this adventure, he occasionally vomited quantities of blue sand.

[CAPTAIN OWEN'S *Voyages to Explore the Shores of Africa.*]

ACT towards others as you would they should act towards yourself. It is the same in life as in the midst of the waves; for every navigator, there is the same sea, the same tempests, the same dangers to beware of. As long as you are borne on a tranquil surface, help those who have suffered shipwreck. Who can say that you will not be overtaken by a storm! you are not yet in port: the same conduct that you have shown to the unfortunate, will be shown to you by your fellow voyagers.—ST. GREGORY; *Book of the Fathers.*

I THINK we may assert that in a hundred men, there are more than ninety who are what they are, good or bad, useful or pernicious to society, from the instruction they have received. It is on education that depends the great difference observable among them. The least and most imperceptible impressions received in our infancy, have consequences very important, and of a long duration. It is with these first impressions, as with a river, whose waters we can easily turn, by different canals, in quite opposite courses; so that from the insensible direction the stream receives at its source, it takes different directions; and at last arrives at places far distant from each other: and with the same facility we may, I think, turn the minds of children to what direction we please.—LOCKE.

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